

Measuring Service Quality in the Social Security Organization (Tabriz Branches)

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ABSTRACT

This paper provides an empirical evaluation of three comparative methods for assessing the quality of service, these three methods are: SERVQUAL, TOPSIS and Loss Function. This study provides a framework for improving the quality of service for managers so that the gap between customer expectations and experience could be measured and an optimal combination of levels of features for customer satisfaction could be selected. Finally, it would be possible to focus on reducing the possible losses arising from poor quality. The statistical population of this research is the insured or policyholders of five branches of Tabriz Social Security Organization. The empirical evidence has been achieved by a sample including four hundred of customer data and using the questionnaire based on SERVQUAL. The results are compared and the relative validity is proven and the questions of the research were answered using these data. The findings indicate that all these methods have the same ability to measure the service quality; however, these methods should not be used as an alternative.

KEY WORDS: Assessing the Quality of Services, Quality Management, Gaps Analysis, SERVQUAL, Quality Evaluation.

1. INTRODUCTION

For decades, the quality of services has been discussed to be one of the most important factors in marketing and as a crucial component in strategic management, in order to succeed and survive in the competitive environment. (Parasuraman et al., 1990) Competitive pressures in most industries, is forcing managers and administrators to find a way to improve their competitive status. Most of them are trying to improve the quality of their service in order to create a differentiation from other services (Caro, 2007). The increasing importance of service quality is independent of the type of the industry so that such concerns over quality, has created some particular engagements in the insurance industry. (Parasuraman et al., 1990)

Recent studies have shown that customers consider the service issues from two different points of view: and Ideal expectations. This has resulted to the creation of tolerance area in assessing the quality of service. This area is what has identified by customers where they hope to have their service in. Thus, service providers should aim to be closer to the ideal level (as much as possible and in a positive direction, with considering the cost) and to be away from the negative level. Indeed, this follows the philosophy of multi-criteria decision making procedures where we seek to minimize the distance from the positive ideal solution (PIS) and to maximize the distance from the negative ideal solution (NIS). Therefore; this issue is a conflicting decision and the organization is striving to consolidate its position with regard to these two reference points.

In the literature of service industries, methods to optimize the distance between the desirable and ideal levels, has not been discussed so far. Moreover, in the literature of service industries, setting tolerance area with characteristics and the importance of these characteristics in respective levels has been discussed (Pasuraman, 2003). However no attempt has been made in the case of detecting total value of service (Sokovic, 2005).

By offering Overall Closeness Rating (OCR), TOPSIS method is used specifically to find the ambiguous area in this study. Furthermore it is likely that the performance of a service organization regarding all of its specifications and dimensions would not always be in the same direction. Insurance sector may design a questionnaire with different answers in order to have an improvement in the dimension of responding to customer's requests however the concerned employee may not be able to be responsible face to face and may not be and explain all of the related details. Thus it is necessary that the employee, who is in contact with customers, seek to address the needs of customers. The Traditional gaps model based on SERVQUAL cannot create such a conflicting situation since improving a specification may destroy other specifications. To solve this problem, the Genichi Taguchi loss function method is proposed which argues that there is an increasing loss (both for producers and for society at large), which is a function of the deviation or variability from the best or perhaps target value of a parameter (Taguchi, 1990). The greater the deviation from target, the greater is the loss.

In this research, a branch that has the lowest loss function, will deliver the best performance in service delivery to customers. The aim of this study is to evaluate and compare the effectiveness of three different known methods for assessing the quality of service including SERVQUAL, TOPSIS and Loss Function. Developing a framework for measuring service quality using these three methods will be also targeted.

Three methods have been used in this study in order to provide an accurate evaluation with greater confidence since in the researches which are conducted with a single method, many limitations and loss of confidence could be detected.

2. METHODOLOGY

The SERVQUAL scale has been tested and/or adapted in a great number of studies conducted

In various service settings, cultural contexts and geographic locations

In order to test the validity and content validity of SERVQUAL in measuring service quality in insurance industry, detailed interviews with 10 clients of the two branches were conducted. This led to improvements in SERVQUAL model. Some factors such as suitability of the branch location (close to work or home), presence of employees at the counter when a customer refers, providing required guidance through the counseling centers, and having access to senior executives as needed, which are absent in the initial SERVQUAL model, have notably been requested by the interviewed customers. Since, the structure of SERVQUAL has largely been followed in this research and only a few changes have been added to it, and regarding the widespread use of SERVQUAL in the service sector, there was no need to conduct confirmatory factor analysis. Concurrent validity of the defined scale will later be compared and tested with the results of gaps model, TOPSIS and loss function. Since the structure of 5 dimensions is available, and according to reliability measurement, the result implies that the defined SERVQUAL scale, is appropriate for measuring the quality of services in the branches of Tabriz Social Security Organization. Our final questionnaire includes 19 questions which consider five standard dimensions of SERVQUAL. Five dimensions of service quality, definitions and the factors are shown in Table 1.

The tool has four sections; the first section of questions is related to the general statistical information. The second section provides explanations about five dimensions of SERVQUAL and the relative importance of each dimension has derived by a fixed relative cumulative scale so that each respondent has been requested to divide the score of 100 among 5 dimensions according to the priority. It should be noted that if the importance of the evaluating criteria is not clear, the application and effectiveness of that tool would be severely limited. Zeithaml and Parasuraman modified the Initial SERVQUAL to be including a fixed cumulative scale for evaluating the weights of scores.

Table 1. Five Broad Dimensions of Service Quality

Dimensions
Responsiveness: Willingness to help customers and provide prompt service
1. Speed of Response to Complaints
2. Concern and Desire for Assisting
3. Providing needed help by the counseling centers
4. Providing a quick and timely service
Assurance: Employees' knowledge and courtesy and their ability to inspire trust and confidence
5. reliability
6. Concern for Customers and respecting them
7. Staff attitude and adequate information in response to customer questions
8. Security for transactions, insurance, etc
Empathy: Caring, easy access, good /communication, customer understanding and individualized attention given to customers
9. Paying attention to customers' needs
10. Explanation the organizational laws to customers.
11. Considering customers interest
12. Ease of Communication
Tangibles Appearance of physical facilities, equipment, personnel and written materials
13. Decoration and convenient facilities within the branch to wait
14. Employees look and proper dressing
15. Availability of kids corners, parking spaces, recreational facilities, food courts.
Reliability: Ability to perform the promised service dependably and accurately
14. Providing timely service
15. Accuracy of Transactions
16. Having access to high ranked officials
17. The presence of staff at the counter

Carmen (1990) argued that the importance and expectations of service quality must be measured by the services received. For its widespread application in the researches related to service industry, Cumulative method was chosen for this study. However DeSarbo and others (1994) have discussed about the problems of applying extracting weights and suggest using a series of reversed weights which indicate the importance instead. But this

method is not used in the present paper, because the objective here is not to measure the overall quality of services. In the third section, respondents are asked to state their perceptions about the services a specific branch in the context of SERVQUAL components, provides for them. In the fourth section, respondents are asked to determine their expectations of an ideal branch in the context of SERVQUAL components. Each component is ranked according to the Likert scale with 4 items, that Score of 1 represents completely dissatisfied and score of 4 Score indicates completely satisfied. Measured dimensions have been validated with Cronbach's alpha. The total amount is 0/888 and the lowest amount is 0/81 and both are more than the required amount of 0/7. Therefore, these figures indicate a high degree of internal coordination. Validity coefficients are shown in Table1

3. Measuring the relative performance of services using Gaps model

Service quality gaps is described by the following equation:

In which P_{ij} , is Indicating the j respondent intake's from dimension i and E_{ij} represents the j respondents' expectations from dimension i . w_i as well shows the in dimension's weight. (Mukherjee, 2005)

Measuring the relative performance of services by using TOPSIS method

To explain this method, a few items should be introduced. E_{max} Is Customer's maximum expectations of an ideal branch and P_{max} , P_{min} , P_{actual} are respectively, the maximum, minimum and average specific values of a selected branch.

Euclidean distance can be calculated as follows:

$$\Delta_i^+ = \left[\sum w_i (P_{ij \max} - E_{j \max})^2 \right]^{\frac{1}{2}} \quad (1)$$

$$\Delta_i^- = \left[\sum w_i (P_{ij \max} - P_{j \min})^2 \right]^{\frac{1}{2}} \quad (2)$$

$$d_i^+ = \left[\sum w_i (P_{ij \text{ actual}} - P_{j \max})^2 \right]^{\frac{1}{2}} \quad (3)$$

$$d_i^- = \left[\sum w_i (P_{ij \text{ actual}} - P_{j \min})^2 \right]^{\frac{1}{2}} \quad (4)$$

And Overall Closeness Rating (OCR) could be calculated as follows:

$$OCR = [\Delta_i^- / (\Delta_i^+ + \Delta_i^-)] [d_i^- / (d_i^+ + d_i^-)] \quad (5)$$

Mentioned OCR, Is made up of two parts, the first part is about customer's expectations of an ideal organization. Its optimal level ($E_{j \max}$) will be calculated from the final part of the questionnaire and the minimum ($P_{j \min}$) and average levels ($P_{j \max}$) will be calculated from the third part of the questionnaire. The second part ($[d_i^- / (d_i^+ + d_i^-)]$) concerns about what customer receives from an organization. Minimum ($P_{j \min}$) and maximum ($P_{j \max}$) and average ($P_{j \text{ actual}}$) levels are achieved from the third part.

TOPSIS graphical diagram is shown in Figure 1.

In this study, Loss Function will be used to measure the quality of services. Already Taguchi loss function has been used to calculate the overall loss through SERVQUAL five dimensions.

Taguchi loss function is a quadratic curve that shows customer dissatisfaction (or losses) and is related to service performance. The Curve is around a target value which represents customer's desired performance. Customer's dissatisfaction will be ascending if the performance is far from the target. Allowed upper and lower tolerance limits for the customer, is limits for deficient performance which are defined by the customer. In this paper, the quadratic loss function was used to calculate Taguchi loss as it is recommended to be more appropriate to evaluate customer's imitative behavior. There is some evidence indicating that customers are willing to treat severely punishing against those companies that provide the services which are far from customer's defined standards. To measure service quality in social security insurance, Loss Function is used. In which overall loss resulting from service performance will be calculated based on SERVQUAL five dimensions. Since it is better to provide the maximum service (characterized by "the more, the better"), weighted Taguchi loss function has been applied.

$$L(z) = \sum w_k [\max 0, 1 / (\mu_k - z_k)^2] \cdot [1 + 3s_k^2 / (\mu_k - z_k)^2] \quad (6)$$

In which W_k is the parameters weights

Graphical Loss Function is shown in Figure 2.

4. Sampling and data collection

Branches of Social Security Organization in Tabriz were chosen for this study. Due to the rapid growth of financial sector and the creation of competitive difficult conditions, it seems essential to control the level of

service delivery and to focus attention to variations in customer demands and satisfaction stimulants in order to maintain the organization's profitable customers. This study was conducted in every five existing branch in Tabriz. Branches ranked by the number of customers and sampling was done with regard to this ranking. Questions were asked from customers in branch's site. Customers filled the questionnaire individually and were interviewed only about the branch they were answering in. The samples were selected based on each branch's number of insured. So the total correct responses were 400. The insured profile is shown in Table 2.

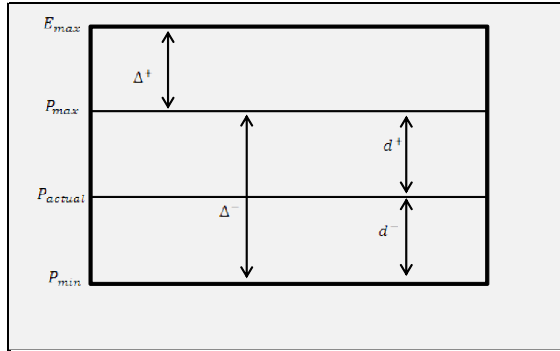


Figure 1. Taguchi loss function

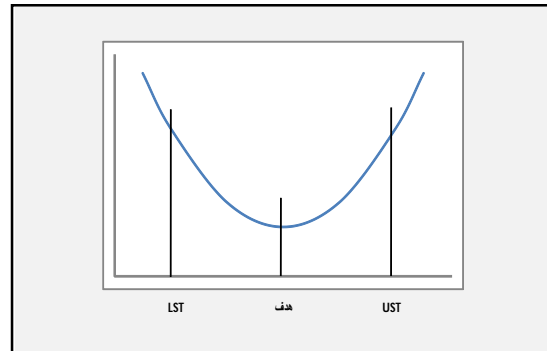


Figure 2. Comparison of service levels using TOPSIS method

Table 2. Profile of sample statistics (total number = 400)

Profile		No (%)
Gender	Male	305 (76.25)
	Female	95 (23.75)
Age	Under 25 years old	51 (12.75)
	Between 25-35	150 (37.5)
	Between 35-45	122 (30.5)
	Between 45-55	55 (13.75)
	Over 55 years	22 (5.5)
Income	Less than 3000000	250 (62.5)
	Between 3000000-8000000	111 (27.75)
	More than 8000000	39 (9.75)

5. Dimensions of quality and their importance coefficient

Due to the results, responsiveness and reliability are the most important dimensions according to customers. This is in contrast with the previous findings (Parasrmn and others, 1991) which reveals that reliability is the most important dimension of services quality. The relative importance of dimensions of service quality is given in Table 4. It should be noted that the results has derived from 400 questionnaires.

Table 3. Relative importance of SERVQUAL 5 dimensions for Tabriz Social Security branches

Dimension	Relative Importance
Responsiveness	26.905
Reliability	23.253
Empathy	18.315
Tangibles	15.912
Assurance	15.615

The relative importance of each item is listed in Table 5. According to the results, the items of "Providing a Quick and Timely Service and Concern and Desire for Assisting" as the subsets of Responsiveness, are very important.

Measuring Service Quality in each branch

First, the overall level of quality services for five branches was obtained using Gaps model and this equation ($SQ = \sum w_i [P_{ij} - E_{ij}]$) and branches were respectively rated based on the obtained scores. First the difference between the expectations of an ideal organization and the perceived services should be acquired. Thus the total value of service quality to be achieved. Whatever the difference is less, the branch performance in providing high quality service for customers, is better.

Table 4. Coefficients of the factors

Dimensions/factors	Coefficients
1) Speed of Response to Complaints	24.41
2) Concern and Desire for Assisting	27.27
3) Providing needed help by the counseling centers	19.3
4) Providing a quick and timely service	29.29
5) reliability	26.1
6) Concern for Customers and respecting them	25.55
7) Staff attitude and adequate information in response to customer questions	27.2
8) Security for transactions, insurance, etc	21.14
9) Paying attention to customers' needs	23.48
10) Explanation the organizational laws to customers.	28.03
11) Considering customers interest	24.57
12) Ease of Communication	23.91
13) Decoration and convenient facilities within the branch to wait	33.72
14) Employees look and proper dressing	31.11
15) Availability of kids corners, parking spaces, recreational facilities, food courts.	35.18
16) Providing timely service	26.34
17) Accuracy of Transactions	29
18) Having access to high ranked officials	20.22
19) The presence of staff at the counter	24.45

The scores of branches in this model are shown separately in Table 5.

Table 5. Scores obtained with Gaps Model in each branch

Branches	Responsiveness	Reliability	Empathy	Tangibles	Assurance
1	-0.129	-0.094	-0.1	-.094	-0.102
2	-0.148	-0.099	-0.118	-0.123	-0.147
3	-0.139	-0.074	-0.089	-0.068	-0.09
4	-0.235	-0.14	-0.165	-0.146	-0.191
5	-0.176	-0.101	-0.162	-0.12	-0.135

5.1. TOPSIS RESULTS

The performances of each branch in all of 5 dimensions were revealed. However the resources are limited and it may occur some disputes about the priority of the dimension to be improved. TOPSIS is a multiple criteria method to identify solutions from a finite set of alternatives based upon simultaneous minimization of distance from an ideal point and maximization of distance from a nadir point (Kim and others, 1997). Each branch must be to achieve an optimal level of service because the lower or upper level may respectively lead to customer dissatisfaction, or overuse of the resources. For each branch, the distance between the ideal level and nadir point was identified and the customers of all 5 branches revealed their expectations from an ideal organization and also expressed the service they received in the certain branch.

The value of the maximum expectations for each branch was calculated. The maximum points for perceived service which is considered as the ideal answer and the minimum points for received service which is considered as the nadir point and actual points which refers to current level of service was also determined. Method was implemented in such a way that each of the branches has the closest distance to the optimal point and the maximum possible distance from the nadir point. The points obtained in this method are shown in table7 for separate branches.

Table 6. Results of the TOPSIS method for each of the branches

Branch1	Branch2	Branch3	Branch4	Branch5
0.303	0.482	0.926	0.205	0.831

Table 7. Performance of branches in each of SERVQUAL dimensions based on Loss function

Loss Function	Responsiveness	Reliability	Empathy	Tangibles	Assurance	total
Branch1	1.271	0.746	0.697	0.399	0.424	3.539
Branch2	0.749	0.366	0.468	0.223	0.456	2.264
Branch3	1.007	0.779	1.055	0.488	0.422	3.754
Branch4	0.365	0.272	0.398	0.372	0.381	1.791
Branch5	0.655	0.449	0.664	0.299	0.257	2.326

5.2. Results for Loss Function

In this paper, the concept of Loss has been used as an alternative for measuring the quality of service.

Taguchi loss function with the characteristic of "the more, the better" was used for calculating the total loss for each of the branches resulting from inadequate service delivery. "The higher the actual value, the better" means that larger amounts, considered to be optimal.

The performance of branches is shown in table8 Using Loss function.

5.3. Comparison of quality of service in various branches

Given the scores of each method and given the measure of quality, the results were rated descending. The results are shown in Table 8.

Table 8. Rating the branches using three methods, Gaps model, TOPSIS and Loss function

Descending rating using three methods		
Gaps model	TOPSIS	Loss function
Branch3	Branch3	Branch3
Branch1	Branch1	Branch1
Branch2	Branch2	Branch5
Branch5	Branch5	Branch2
Branch4	Branch4	Branch4

Every evaluation method has some limitations, such as considering subjects from a specific viewpoint and with some particular presumptions. We use several methods in order to gain high confidence and eliminating related restrictions in this paper. As shown in table 8, all of methods used in the paper release the same ranking results for branch 3 to be as the first branch and also implies branch 1 on the second rank. Therefore we can remark the service quality of the mentioned two branches assuredly. Accordingly, the ranking result which indicates the fifth place for branch 4 is almost certainly acceptable. Three methods which were argued in the paper deliver different rating results for other branches so the accuracy of commentaries would be low.

5.4. Statistical analysis of ratings

According to our null hypothesis, ratings of these three methods are independent. In our Kendall's W (Kendall's coefficient of concordance) was used for assessing agreement among raters. By using equations 6 and 7, Kendall's coefficient (W) was obtained 0/95. Test statistics(S) was obtained 86 which was more than the critical value of 75/6 for a significance level of 0/01. Hence for this significance level, the null hypothesis is rejected. As a result we conclude that there is an agreement between the rating methods.

6. Conclusion

In this paper, we began with obtaining the service quality in five branches using gaps model, then the closeness to the ideal level was achieved using TOPSIS. The process was continued with identifying the loss for each of the braches using Loss Function.

Statistical tests indicate the agreement between different rating methods. Results explicitly show that all of alternative methods can be applied for measuring the service quality. However, they should not be used separated and interchangeably. Studies and our experience show that the use of dimensional measurement techniques is too simplistic. The Studies and experiences show that the dimensional use of measurement techniques is too simplistic. Having a broader and more comprehensive perspective about the quality of services, which is the result of applying various measuring methods, could be more useful. Since the Gaps model is a good starting point for analysis, other methods should be applied within the determined framework and in accordance with this method.

In Gaps model, the problem of using mean for integrating a data set arises when gaps have different signs and positive and negative deviations are eliminated together. It only seems logical if the dimensions could compensate for each other. But the dimensions of service quality could rarely compensate each other. For example, a customer who is dissatisfied with the lack of accuracy of bills could hardly be satisfied with the speed of its issuance. TOPSIS resolve this problem by choosing the superior variables and with respect to be closer to the ideal level (as much as possible and in a positive direction, with considering the cost) and to be away from the negative level. Another on TOPSIS method is preferred over other methods for the following reasons: Including a logical concept in which the relativity of choices is covered, scalar values account for both the best and the worst alternative simultaneously, is intuitive, easy to understand, and can be modeled and solve by the consultants and managers using simple computer codes or Lotus/Excel worksheets. (Kim and others, 1997) moreover, TOPSIS allows the straight linguistic definition of weights and ratings under each criterion, without the need of cumbersome pair-wise comparisons and the risk of inconsistencies. Although positive ideal and negative ideal points are highly considered in this method, but the relative importance of the distances is neglected (Opricovic and Tzeng, 2004)

When the performance of branches, results in a loss, compensatory measures must be taken, particularly if

the loss is greater than all other competitors. Loss of service quality would generally assume positive gaps as zero and calculates the percentage of cases that have a negative gap (Hussey, 1999; Felicien and Ord, 2000). Recorded cases of negative gaps rose to the second power in order to intensify its effect and to change its sign to positive. Whatever the loss of services is less, the Customer satisfaction of performance, will be more.

The loss functions are very efficient, and have the Ability to combine different dimensions of service quality in a single index of Taguchi loss function. Even when the units of measuring dimensions and the values are different, this combination is possible. Non-linear structure puts more values among those close to the target level. The loss functions of service, designed by Stewart (1992) have achieved a good score: multiple uses by non-specialists, the transparency of logic and method for decision makers, being unequivocal because of the inputs interpretation required for decision makers. However, the main disadvantage of loss functions for service is the sensitivity to value's weights. So that the decision maker (the director of organization) may have difficulty in determining the appropriate weight.(Festervand and others, 2001) The loss function has the best application only if the aim is not to find the best answer and we seek to achieve a rating number of items to acquire manageable subset. The aim is to increase the available information for decision makers not its unilateral use in decision making. (Festervand and others, 2001; Pilkington, 2008)

Comparison of three methods for measuring the quality of services is summarized in Table 9.

Table 9: Comparison of three methods of measuring service quality

	Gaps Model	TOPSIS	Loss Function
Key Resources	Parasuraman and others (1985, 1988, 1994, 1993, 1191)	Howang and Lin (1987)	Taguchi (1986)
Fundamental Philosophy	To rate based on the gap between expectations and perceived service	To rate based upon simultaneous minimization of distance from an ideal point and maximization of distance from a nadir point	To rate based on the amount the product moves away from the
Basis of Measurement	The expectations of customers	The ideal and negative levels	The maximum possible value
Managerial Applications	Different service sectors like banking, health care, hotels, telecommunications	Textile industry, water, manufacturing industries	Banks, airlines, evaluating staff performance, selecting suppliers
Strengths	Easy to understand, widely used, containing clear concepts	easy to compute, easily understood, Logical appearance, scalar values, simultaneous consideration of the best and the worst factors	Non-linearity, efficiency, easy to use, being logical, containing common indicators
Weaknesses	Relative correlation between expectations and perceives, differences in statistically variance for perceives and expectations, considering different signs in calculating mean for gaps, Compensatory process	The relative importance of ideal and negative levels is not considered	Weighted sensitivity, lack of optimal response

The results shown in Table 6 indicate that the third branch had the lowest gap, and the fourth one had the maximum gap. All of the branches have the maximum distance with customer's expectations in the dimension of responsiveness. Reliability behind responsiveness possesses the maximum gap in total scores of 5 dimensions. Therefore the branches should plan to get closer to customer expectations of service levels in these two dimensions.

The results listed in Table 7 of the TOPSIS method also confirmed the results of the Gap model; in the relative comparison, the fourth has the worst situation.

Given that the measuring with Loss function is based on the characteristic "the higher the actual value, the better," was conducted. So the branch with the highest score will suffer the least damage. The results shown in Table 8 also provide better validation for the third branch among other branches.

To understand the minimum level of customer expectations, and the quality of performance he receives, gaps model could be used. Whatever the difference is lower, the branch's performance in providing high quality services to customers is better. Therefore it is imperative that the branches that have high gaps in one or more dimensions of quality prioritize the gaps and resolve them given its priority.

Using Gaps model, the performance of each branch in every single dimension was determined. However the resources are limited and it may occur some disputes about the priority of the dimension to be improved. TOPSIS is a multiple criteria method to identify solutions from a finite set of alternatives based upon simultaneous minimization of distance from an ideal point and maximization of distance from a nadir point Each branch must be to achieve an optimal level of service because the lower or upper level may respectively lead to customer dissatisfaction, or overuse of the resources. The performance with the least loss is preferable. Similarly, better branches have the scores more than average. According to this analysis, the financial loss in every dimension could be calculated and managed in order to reduction the loss.

The branches should also care about the loss incurs in service delivery based on Loss function, and authorize to reduce this loss in their policies and decisions. Because the service loss will lead to reduced customer satisfaction and consequently decrease the number of customers. In this study, a multi-dimensional guide is plotted for decision makers in service industries. This guidance aims to empower decision makers to

interpret the customer's reactions and to improve the overall level of service quality and customer satisfaction.

These three techniques of measuring the quality of services can be placed in one framework in future studies, a framework that will be able to measure the service quality gaps, will be able to select an optimal combination of parameters for the customer satisfaction and will be able to concentrate on reducing the potential losses due to poor quality of service.

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